

Living with a Star Community Meeting
May 10-12, 2000

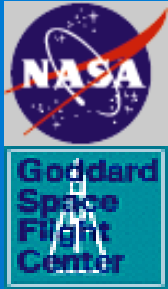


User Perspectives



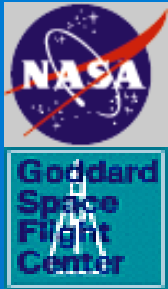
User Representative: Janet Barth
Applied Engineering & Technology Directorate

User Requirements Manager: Rick Wesenberg
Systems Engineering



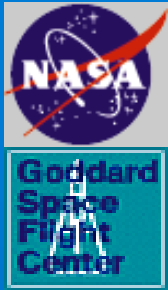
Outline

- Living with a Star science model
- Description of application areas
- Formulation of user requirements
- Summary of user requirements
 - Pre-formulation only
- User presentations



Meeting Science Needs of User Communities

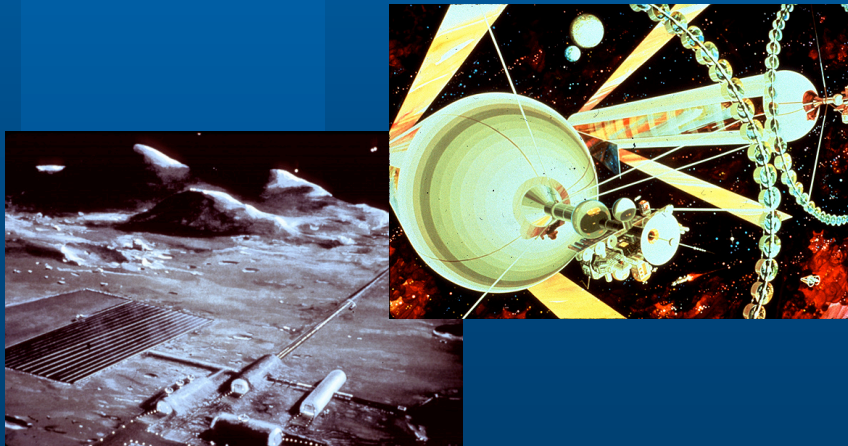
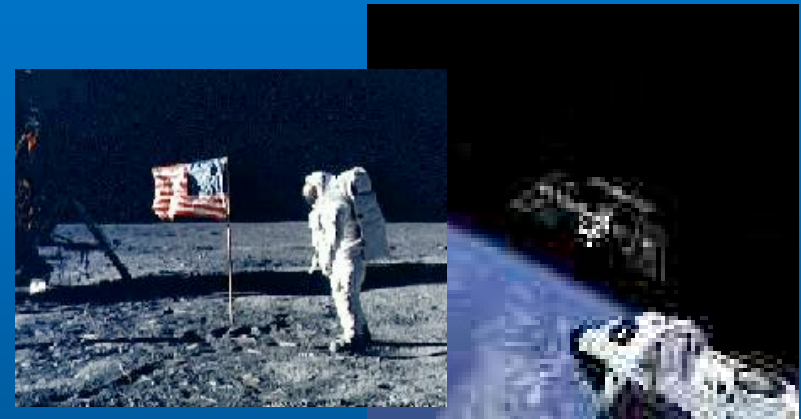
- **Living with a Star science model**
 - User needs are used to influence the direction of science research, and the results will transform to application areas seamlessly.
- **Why the change?**
 - As our biosphere expands further into space, humans are increasingly vulnerable to the effects of solar variability due to
 - increasing human presence in space,
 - increasing use of environmentally sensitive technologies, and
 - increasing dependence on space technology on Earth.
- **Goal of Living with a Star**
 - Develop the scientific understanding necessary for us to effectively address those aspects of the Connected Sun-Earth systems that affect life and society.



Human Radiation Exposure

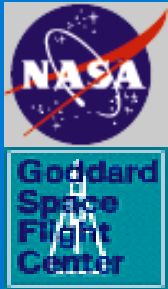


- Space Station, Space Exploration
- High Altitude Flight
- Space Utilization & Colonization

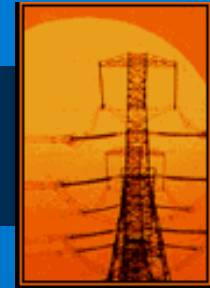


The SR-71 spy plane, developed in the 1960s, was the first to use stealth technology.

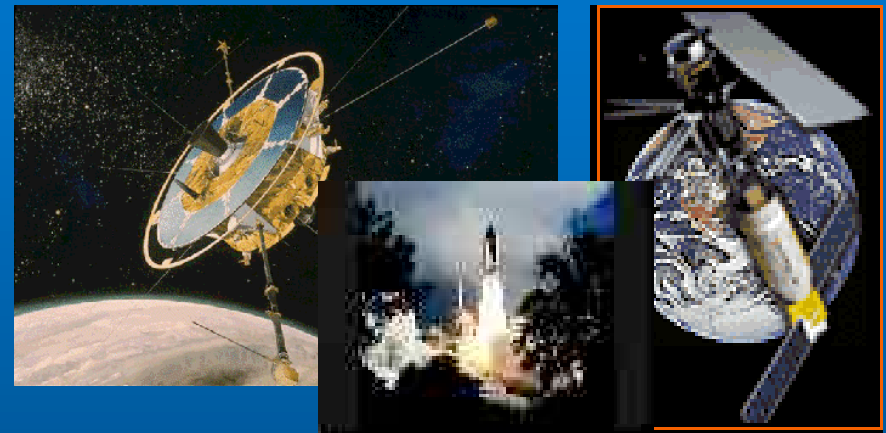




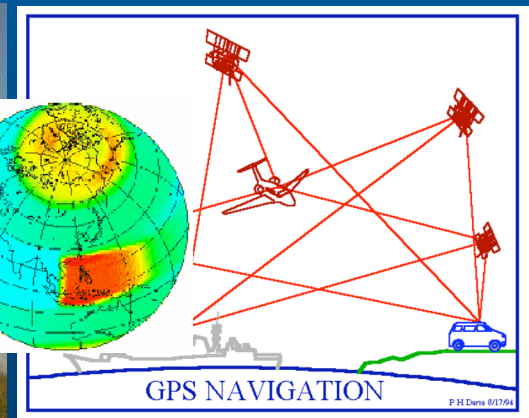
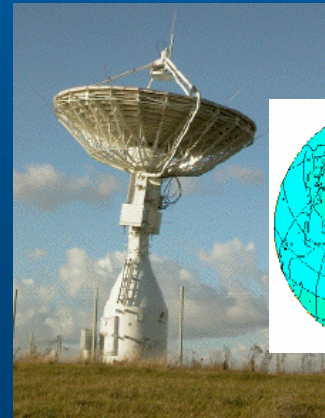
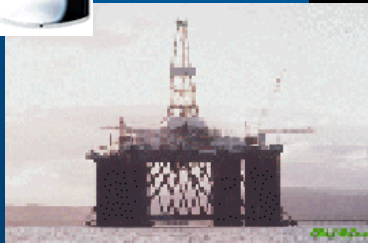
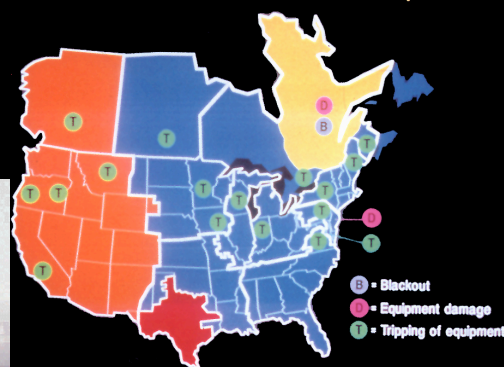
Impacts on Technology

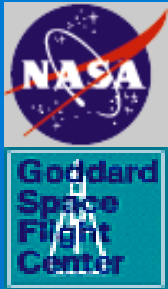


- Space Systems
- Communication & Navigation
- Ground Systems



POWER SYSTEM EVENTS DUE TO SMD MARCH 13, 1989

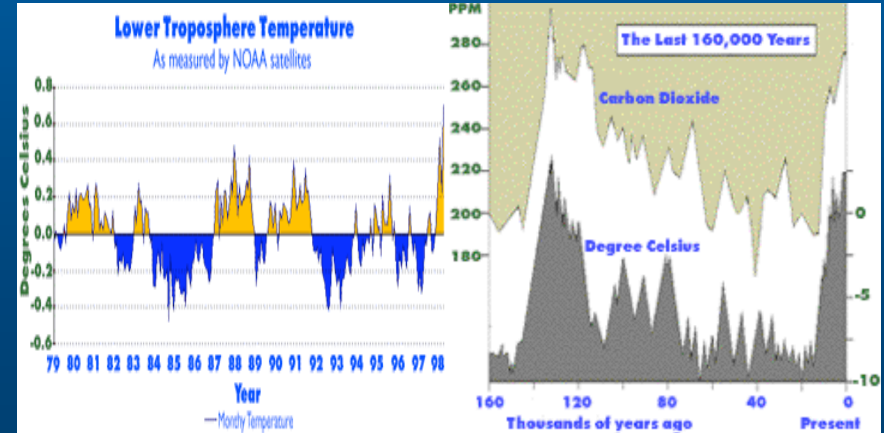
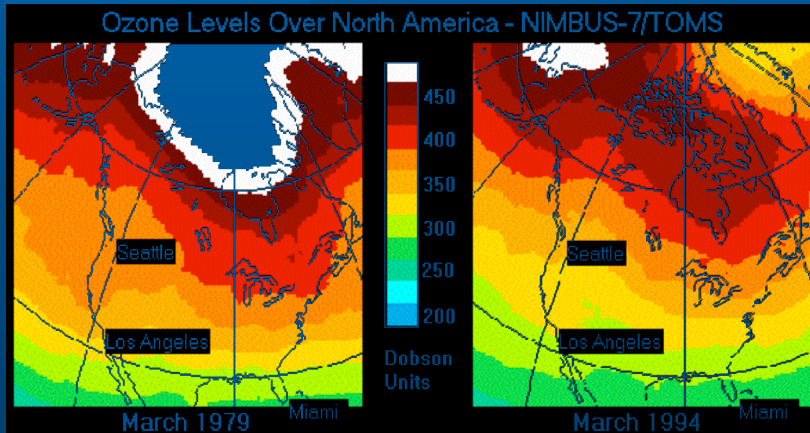
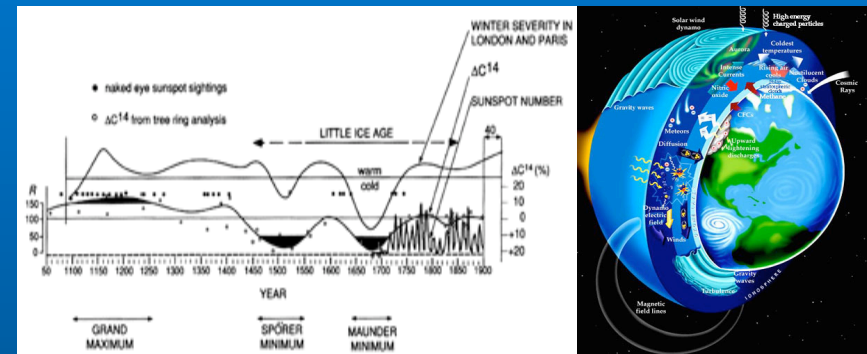


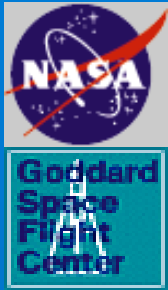


Impacts on Life & Society



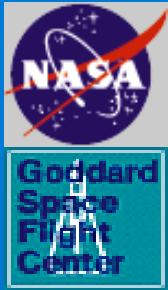
- Global Climate Change
- Surface Warming
- Ozone Depletion & Recovery





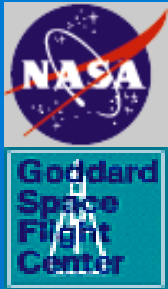
Formulation of User Requirements

- **Pre-formulation phase**
 - *Strategic Plan & Implementation Plan* for the National Space Weather Program - National Science Foundation
 - *Space Weather Architecture Study* - National Security Space Architect
 - *Radiation and the International Space Station* - CSSP & CSTR
 - LWS Pre-formulation Workshop, February 9-10, 2000 at GSFC
 - Participants: Aerospace, Boeing, FAA, NASA/GRC, NASA/GSFC, NASA/JSC, NASA/MSFC, NOAA, ONR, USAF
 - Space Weather Week 2000 - NOAA, May 1-5, 2000
- **The Living with a Star program**
 - To be defined
 - User input at splinter group meeting



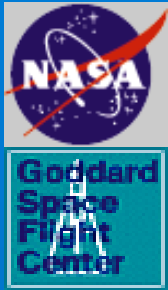
User Needs from Pre-formulation Phase

- **Space Weather warnings, nowcasting, forecasting, post-analysis**
 - Fewer False Alarms
 - Longer Lead Time
- **Understanding of geo-effectiveness of solar variability**
- **Measurements in all domains - heliosphere to terrestrial**
 - Wide-range Specification/Climatology
 - Some real-time or near real-time data
 - Fine measurement grids
- **Improved application oriented environment models**
- **Understanding of space weather effects on new technologies**
- **Resources to derive benefit from existing data**
- **Understanding of end user's perspective - operators**
 - Vendor involvement
- **Partnerships - Government, Industry, Universities**
- **Education**



Presenters - AM

- **National Science Foundation Perspective**
 - Richard Behnke
- **National Oceanic & Atmospheric Administration Perspective**
 - Ron Zwickl
- **Department of Defense Perspective**
 - Michael Bonadonna/USAF/XOW
- **Splinter Groups**



Presenters - PM

- **Human Exploration of Space Perspective**
 - Janet Barth for Mike Golightly/NASA-JSC
 - Ron Turner/ANSER
- **Federal Aviation Administration Perspective**
 - Paul Armbruster
- **Commercial Spacecraft Perspective**
 - Bill Heidergott/Motorola
- **Earth Sciences - Climatology**
 - Pierre Morel/NASA-HQ
- **European Space Agency Space Weather Program**
 - Eammon Daly/ESA
- **European Space Agency Science**
 - Eckart Marsch/Max-Planck Institute